

After the Fires: Soil Safety After the L.A. Wildfires, Debris Removal, and More: What have we learned so far?

September 13, 2025

Thank you for joining!

The event will begin shortly.



AFTER THE FIRES WEBINAR SERIES



Welcome!



Andrew J. Whelton, Ph.D.

Moderator

Professor

Lyles School of Civil and Construction Eng.

School of Sustainability Eng., Environmental and Ecological Eng.

Purdue University, Indiana

Meeting purpose and special thanks

After the January 2025 wildfires in Los Angeles County multiple community groups formed to help households, businesses, and government agencies recover.

Multiple university research teams and municipalities who have experience with prior fires were called for advice.

♥ Special thanks are extended to:

- ♥ Households and business owners in the Eaton Fire and Palisades Fire impact areas who reached out with questions about soils and rebuilding issues.
- ♥ Community groups such as Pali Strong and Eaton Fire Residents United have been helping organize community and share knowledge
- ♥ Our panelists

General Overview

- 12:00** **Welcome and introductions**
- 12:10** **New developments from recovery to the Palisades and Eaton Fires**
- 12:30** **Panel Discussion: Soils, rebuilding, fruit, gardens, and more**
- 12:55** **Wrap up**
- 1:00** **End**

A recording of this event will be posted at www.PlumbingSafety.org

Soil Safety is Important

Health, safety, and economic security

Residential and commercial construction




Recreation

Fruit trees and gardens






California has long recognized wildfire debris removal and soil sampling as important to remove health risks and restore economic value

Recovery Guide to Wildfire Debris Removal



Consolidated Debris Removal Program
Overview for Residential Property Owners



Metals of Prior Concern

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Mercury
- Molybdenum
- Nickel
- Selenium
- Silver
- Thallium
- Vanadium
- Zinc



Phase 1 Overview

Debris Removal



Home Wildfire Debris is Toxic

Wildfire debris contains toxins like lead, mercury, arsenic, and asbestos.

After Phase 1 removes the most visible household hazardous waste, the rest of the toxic debris must be removed safely to protect your community's air, water, and land.

Step 1: Phase 2 Cleanup Options

Communicate directly with your county about which of these two options you select to do the required debris cleanup:

- A. Enroll in the state-managed and funded program or a Right-of-Easement program
- B. Hire a private contractor by enrolling in the alternative private cleanup program

Step 2: Site Assessment

Assessment teams inspect each property to create a safe plan to remove debris.

Step 3: Asbestos Assessment and Removal

Specialists test for and remove asbestos that wasn't removed during Phase 1.

Step 4: Debris Removal

Government-managed crews clear ash, debris, and contaminated soil after giving property owners 24 to 48 hours notice.

Step 5: Soil Testing

Contractors test independent soil samples for contaminants like lead or mercury and remove contaminated soil until it meets background screening levels.

Step 6: Hazard Tree Removal

Contractors identify and remove fire-damaged trees in danger of falling on public property or deemed a hazard to crew safety.

Step 7: Erosion Control

Crews place mulch where structures once stood to protect the soil and watershed from eroding away.

Step 8: Final Walk-Through

State supervisors inspect the property to verify that all work was completed satisfactorily.

Soils Have Been a Hot Topic

After the January 2025 Palisades Fire and Eaton Fire...

- Federal, state, county governments did not provide post debris removal soil testing support
- L.A. County did not require soil testing as a condition of residential rebuilding permits
- L.A. County hired a contractor to answer soil testing questions they had
- Two university groups stepped up to offer free soil testing: UCLA-LMU-Purdue and USC

More recent events

- May 3, *L.A. Times*: 2 of 10 Eaton Fire scraped properties exceeded a soil safety standard
- May 8, L.A. County contractor: 27% of samples of 30 scraped properties exceeded a standard
- May 14, Ten universities ask California to provide L.A. County financial and technical support
- August 7, *L.A. Times*: Federally managed contractors left contamination behind
- Week of August 18 – California issues Residential Soil Evaluation Guidance for the January 2025 fires
- August 25, USC reports 49% of 2,964 soil samples they received from property owners exceeded the lead standard; UCLA reported that 48% of 474 scraped properties they visited exceeded the lead standard. Testing ongoing.

DTSC Soil Evaluation Guidance

Adopted almost all recommendations the 10 universities made in May 2024, but deviated from CalRecycle standard wildfire soil cleanup goals

Chromium(VI) and lithium not recommended by DTSC for testing.

➤ Not surprising, not historically included.

New DTSC wildfire soil cleanup goals are less stringent than previously allowed by the State of California for other wildfires.

➤ CalRecycle often required wildfire cleanup to metal levels **below** hazardous waste thresholds. New DTSC guidance does not. Unlike previously, the new DTSC cleanup goals do not consider the economic impacts of contaminated soil left on the property.

Residential Soil Evaluation

GUIDANCE FOR THE 2025
LOS ANGELES WILDFIRES



Key Points for Residents:

- | | | | |
|---|---|---|---|
| ■ Soil testing will help determine if your home has contaminated soil that could harm human health and if cleanup is needed | ■ This guide outlines steps to help residents make informed decisions | ■ Property owners are responsible for coordinating sampling and cleanup | ■ Resources are available to support the recovery and rebuilding effort |
|---|---|---|---|

Since the devastating fires erupted in January, California has established a robust partnership with federal agencies and local governments to ensure a safe and expeditious recovery. Wildfire ash can contain harmful metals like lead and arsenic that settles into the soil, especially where buildings or debris have burned. This guide covers soil sampling from inside and outside the fire zones for three kinds of properties:

- Total Building Loss
- Partial Building Loss
- Buildings Still Standing

The Department of Toxic Substances Control (DTSC) has expertise assisting local and state agencies with establishing soil standards to promote a safe and successful fire recovery for residents. **This guidance applies only to post-fire recovery actions taken to evaluate and clean up soil on residential properties impacted by the 2025 fires.**



Area of the Palisades Fire



Area of the Eaton Fire

Maps Created with MapBrowser© 2025 Nearmap US, Inc

August 2025

What Can You Do About Soil?

1. **Avoid** contaminated soil; wipe feet, shoes off, wash hands
2. **Get advice** from prequalified residential soil sampling consultants recommended by L.A. County
3. **Be aware** of where the fill dirt is coming from before delivering to your property
4. **Consult** your insurance company about soil testing and rebuilding: Health vs. economic value of property
5. **Consult** your lender about their soil safety requirements for rebuilding
6. **Talk with elected officials** about the gap created by the state and county not supporting standardized soil testing like past county, state, and federal level wildfires in California

Environmental Consultant List

City Planning has created a standard list of consultants from which applicants will be required to hire when preparing environmental content pursuant to the California Environmental Quality Act for development projects. Each consultant on the City's standard list has a contract with the Department that guides the terms, conditions, and performance standards for the required work.

Applicants are required to select from among the following City-approved firms:

- | | |
|---|---|
| - AECOM Technical Services, Inc. | - Kimley-Horn and Associates, Inc. |
| - Burns & McDonnell Engineering Company, Inc. | - LSA Associates, Inc. |
| - CAJA Environmental Services, LLC | - Meridian Consultants LLC |
| - CDM Smith Inc. | - Michael Baker International, Inc. |
| - Chambers Group Inc. | - Parker Environmental Consultants |
| - Dudek | - PlaceWorks |
| - EcoTierra Consulting, Inc. | - Psomas |
| - Envicom Corporation | - Rincon Consultants, Inc. |
| - Envi | |
| - Eyes | |
| - FCS | |
| - ICF Jones & Stokes, Inc. | - Wood Environment & Infrastructure Solutions, Inc. |
| - Impact Sciences, Inc. | |

<https://planning.lacity.gov/>

NEW (this week): Household Recovery Decisions

Helps establish a basic understanding

Developed from our response to the East Palestine chemical disaster and January wildfires.

- Environmental sampling and testing focus.
- Accessible to property owners and officials.
- Includes discoveries from 100s of home environmental testing reports and in 1-on-1 meetings.
- Valuable for inspection, testing and sampling companies as well as insurance companies.


Whelton, Bollens, Ferrarezzi (2025).

Access FREE here → <https://docs.lib.purdue.edu/red/1/>

PURDUE UNIVERSITY.

After a Wildfire:

Considerations for Building Environmental Testing



Overview

1. Damage & building contamination
2. What & where are the contaminants?
3. Role of sampling & testing in restoration, damage identification, and remediation
4. Sampling & testing is conducted to understand the damage
5. Who should conduct testing & what is their scope?
6. What should be tested for & where?
7. FAQs
8. Remediation & post-remediation
9. Acknowledgement & additional information

1. Damage and Building Contamination

Wildfires can directly and indirectly make buildings unsafe by introducing physical, chemical, and microbiological pollutants. These pollutants can pose an immediate and long-term [health](#) and safety risks to building users. Particles, gases, and vapors are often released and created from burning structures, vehicles, and other items. Microorganisms can grow due to the presence of water due to pipe breaks and leaks, fire-fighting activities, local climate, and other conditions. Before entering a fire-impacted building, proper inspection and testing are highly recommended.

Signs of contamination being present can include broken and melted building components and systems, dust, debris, ash, and soot deposits on floors, walls, ceilings, personal items, inside HVAC components, corroded metals, electrical system malfunctions, and discolored interior and exterior walls. Indirect damage indicators can be odors and illness symptoms. Not all damage may be visible (i.e., in wall cavities, attics, drywall, personal items).

Persons impacted by wildfire should seek advice from their health department and competent professionals. The property should not be entered without proper safety equipment and protocols to protect against hazards and spreading contamination to their vehicles, other residences, and other people.

Following A Structural Assessment, A Building Inspection Should Be Conducted and Include:

<ul style="list-style-type: none">• The building exterior• Natural gas system• The garage, attic, crawlspace• The heating ventilation and air conditioning (HVAC) units and associated components• All ceilings, walls, floors, shelves in every room, including hallways and closets• Electrical system including the breaker box, wiring, and electrical components (i.e., switches, outlets).• Personal electronic items (i.e., TV, personal devices, stereo, DVD, VCR, etc.)• Personal items• Plumbing fixtures• Other fixtures (i.e., cabinets, lights, etc.)	<ul style="list-style-type: none">• Furniture (i.e., couches, mattresses, etc.)• Appliances such as microwave, oven, dishwasher, washing machine, dryer, humidifier, etc.• Pools and spas• Fire sprinkler system <p><i>At a minimum, persons conducting the assessment should wear proper safety equipment including a properly fitted respirator (P100+OV/AG elastomeric air purifying respirator with organic vapor and acid gas cartridges), safety goggles (ANSI Z87.1 D5), chemical-resistant gloves, long sleeves, long pants, sturdy shoes, disposable Tyvek suit, and shoe covers to limit exposure and contamination spread. Inspections should be carried out with more than one individual. Conditions may be present where greater levels of protection are necessary.</i></p>
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Center for Plumbing Safety at Purdue University, West Lafayette, Indiana USA
Date: Sept. 9, 2025; Authors: Whelton, A.J., Bollens, E., Ferrarezzi, C.G. (awhelton@purdue.edu)

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After The Fire: Home Garden and Fruit Tree Safety

Chemicals and particulate matter in wildfire smoke are associated with short- and long-term health effects. This is mainly caused by long-term exposure to particulate matter, or "PM".¹ When wildfires burn homes and buildings, harmful compounds and heavy metals are released during the combustion of materials such as plastics, petroleum, asbestos, and batteries.² These contaminants in wildfire ash can coat garden produce and enter soils and water sources, potentially harming people through food and drinking water contamination.³

After wildfires, there are simple precautions you can take to reduce your exposure to potential contaminants in your garden.

How Food Becomes Contaminated

During wildfires, plants accumulate chemicals and metals in numerous ways, including through deposits of ash on leaf surfaces (Figures 1, 2) or soil-root uptake.^{4,5} Plant characteristics also affect the ways these potential contaminants become stored on and within the plant. For example, root vegetables directly contact soil contaminants, while large leaves collect airborne PM (like smoke and ash) and soil splash. Woody plants, such as fruit trees or cane berries, are less likely to pass soil contaminants touching roots into edible plant parts, but all plants can absorb airborne surface deposits through leaves. Smooth fruits, like tomatoes, squash, apples, pears, and berries, likely uptake the least compounds from airborne PM.^{2,5} A smoke impact study during an urban wildfire surprisingly found minimal leafy vegetable contamination and therefore a low expected increase of health risk.⁴ Rinsing vegetables works to reduce overall contaminants, and can effectively remove certain contaminants (e.g. lead and cadmium) from leaf surfaces, although adequately removing trace contaminants depends on the crop species, soil type, and PM size.⁶ Remembering to be mindful while gardening and harvesting helps to limit your exposure to potential contaminant hazards.

Minimizing Risks While Gardening During and After Wildfires

Humans are most exposed to wildfire contaminants directly from their environments, particularly from inhaling smoke, contacting contaminants with bare skin, and ingesting contaminants from hand to mouth. Eating produce from smoky gardens carries minimal risk.^{2,4} Those at greatest risk of health impacts are older adults, children, individuals who are pregnant, have cardiac or respiratory conditions, work outdoors, or are lower economic status, which relates to residential condition and access to nutrition and healthcare.^{1,7} **Limiting time outside and contact with contaminants reduces one's overall risk, especially for people with additional health concerns.**



Figure 1. Inspect produce for heavy layers of ash or dust. Discard produce with burns, soot, or fire suppression chemical residue.

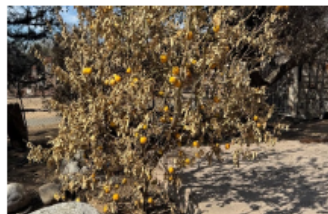


Figure 2. A scorched fruit tree indicates exposure to heat and potentially harmful particulate matter. Photo: Yana Valachovic.

Fruit Tree and Garden Safety After Wildfires

Benterou et al. 2025.

Access FREE here →

https://ucanr.edu/sites/default/files/2025-05/UCANRFireNetwork-AfterTheFire-HomeGardenFruitTrees_0.pdf

Panel Discussion

Soil, rebuilding, fruit, gardens, stormwater, and more



**Marc Mattox,
PE**

Town Engineer,
Town of Paradise,
Site of the 2018 Camp Fire
California



**Cameron
Fowlkes, PE**

City Engineer,
City of Louisville,
Site of the 2021 Marshall Fire
Colorado



**David
Benterou**

Research Associate,
UC Agriculture and Natural
Resources,
Author of the Wildfire
Fruit/Garden guidance,
California



**Jack Webster,
PE, PhD**

Professor,
Chico State University
Post-fire water quality
across numerous major
wildfires, California



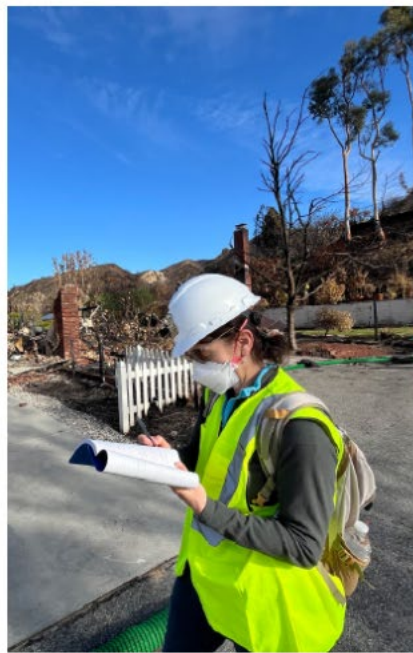
Eric Bollens

Chief Technology Officer at
LightBox and Resident
impacted by the Palisades
Fire, California



Webinar Series: *After the Fires*

Register for the webinars at
www.PlumbingSafety.org



Lessons from the Eaton Fire and Palisades Fire, California

August 18

The LA Pools
Study: What
was in the
water?

Recording
available

September 13

Soils, Debris,
Fruit, Gardens,
and More

Recording
to post 9/15

September 20

The REBUILD Survey:
Overview and First
Look

Register now
www.PlumbingSafety.org

October 20

The REBUILD Survey:
Physical and mental
health

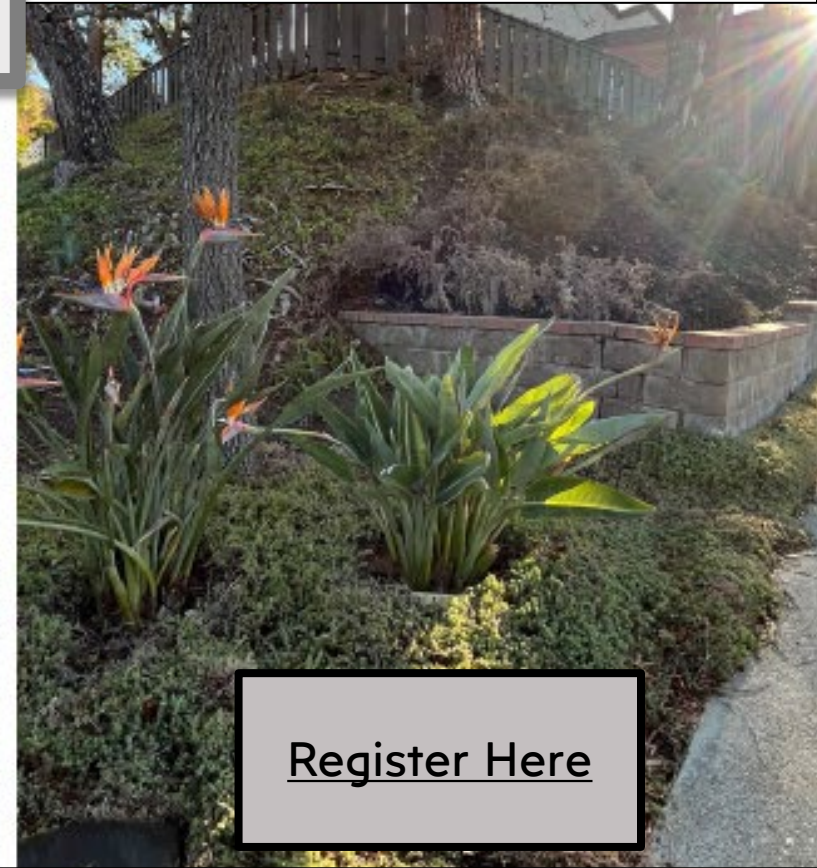
November 17

The REBUILD Survey:
Property testing,
remediation, and
insurance

AFTER THE FIRES WEBINAR SERIES

The L.A. Wildfires REBUILD Survey: Overview, household experiences, needs, and perceptions

Register for the Zoom webinar
September 20, 2025, 9:00–10:00 am PST



[Register Here](#)

After the Fires:

***Soil Safety After the L.A. Wildfires, Debris Removal, and More:
What have we learned so far?***

This event has ended

Thank you

A recording of this event will be posted at www.PlumbingSafety.org

Questions about this event can be directed to:
Professor Andrew Whelton, awhelton@purdue.edu